2012 Maine Envirothon Theme

"Non Point Source Pollution/Low Impact Development"

Date: September, 2011
To: Students and Advisors
From: Thomas Parr and tish carr
Re: Current Issue Testing Station

Testing at the Current Issue Station – "Non Point Source Pollution/Low Impact Development"- is different than at the other stations. This station involves a written exam and an oral presentation. Teams will present their poster to two or three judges, an additional judge will oversee the written testing.

All teams should investigate, research and prepare a poster and a **5-minute oral presentation** addressing the current issue project for *Regionals*. Teams should practice presenting in the allotted time. Please note that team members are allowed to refer to note cards when presenting. Posters should be used during the presentation. If time allows, judges may pose a few questions. Judges will use the enclosed scoring rubric to score each team's presentation. (NOTE: A **7-minute oral presentation** and 2-minute Q&A format will be used for the **State Final** – there will be no written exam at the State Final.)

Rules regarding the poster presentations:

Each team is allowed to create 2 posters. Posters can be attached but can be no larger than a total of 1,232 square inches. This is equal to two poster boards 22 x 28 inches each.

Teams may redesign their posters into other shapes (ovals, etc.) or even three dimensional designs, however, the total area cannot exceed 1,232 square inches. All fonts must be 18 pt. or larger. Teams cannot make posters with removable parts for use at the competitions. The poster(s) must remain intact.

There should be no writing, other than the Team/School name, on the back of the posters. <u>Any medium</u> may be used to create the poster(s). However, IPADS, PowerPoint or any thing involving motion and pictures is not allowed.

Teams should bring their posters to the registration desk when they arrive at the competition. Overlays are permissible but can not exceed the poster size of 22 x 28 inches or 1232 square inches. Multiple overlays are permissible but total overlays can not exceed poster size.

Rules regarding the written test:

Teams cannot use note cards during the written portion of the test.

Testing and Judging Process

The total time period at the Current Issue Station is 30 minutes. This is a very tight time schedule! Teams rotate through the testing and presenting sequence. As one team is making its oral presentation (5 minutes), another is taking the written exam (20-25 minutes). Any team may be interrupted during the written portion and asked to present their poster. If so, a judge will keep track of the remaining time and allow the team to return to the written exam once finished with the presentation portion.

Scoring

The poster presentation is worth 60 points at Regionals and 100 points at State Final.

The written test is worth 40 points at Regionals. There will be no written test at State Finals. The three teams closest to the Finals will begin CI presentations 30 minutes early to accommodate the longer presentation format that is more similar to the National Envirothon competition format.

If you have questions please email them to tish.carr@maineswcds.org.

Good Luck and Have Fun!

MAINE ENVIROTHON 2012 CURRENT ISSUE

"Non Point Source Pollution/Low Impact Development"

RATIONALE:

Nonpoint source pollution (NPS), unlike point source pollution, which can be traced to a single source like an industrial or sewage treatment plants, can come from many different sources. Stormwater runoff collects these pollutants and conveys them to our streams, rivers, reservoirs and other bodies of water. Many of these pollutants are generated by normal human activities. Lawn care products are often applied in excess resulting in fertilizers, herbicides, and insecticides washing into waterways. Improperly maintained vehicles can be a source of oil, grease, and toxic chemicals. Erosion in construction sites, agriculture, and stream banks can be a source of sedimentation and nutrient loading to streams. Faulty septic systems and pet wastes can be a source of bacteria and nutrients to aquatic systems. Collectively these pollutants degrade aquatic ecosystem quality.

An estimated 60 percent of current water pollution is attributed to stormwater runoff. Nonpoint source pollution can contaminate drinking water, destroy wildlife habitat, close beaches, kill fish and cause many other serious environmental and public health problems. Every year, millions of dollars are spent to restore and protect areas damaged by nonpoint source pollutants. Stormwater has been identified as one of the leading sources of pollution for all waterbody types in the United States. Furthermore, the impacts of stormwater pollution are not static; they usually increase with more development and urbanization.

One of the most exciting new trends in managing stormwater runoff is the increased use of **Low Impact Development (LID)** to help protect and restore water quality. LID comprises a set of approaches and practices that are designed to reduce runoff of water and pollutants from the site at which they are generated. By means of infiltration, evapotranspiration, and reuse of rainwater, LID techniques manage water and water pollutants at the source and thereby prevent or reduce the impact of development on rivers, streams, lakes, coastal waters, and ground water.

LID is an approach to land development (or re-development) that works with nature to manage stormwater as close to its source as possible. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treats stormwater as a resource rather than a waste product. There are many practices that have been used to adhere to these principles such as bioretention facilities, rain gardens, vegetated rooftops, rain barrels, and permeable pavements. By implementing LID principles and practices, water can be managed in a way that reduces the impact of built areas and promotes the natural movement of water within an ecosystem or watershed. Applied on a broad scale, LID can maintain or restore a watershed's hydrologic and ecological functions. This means that LID is a community solution to a community problem. At home your LID may look like a vegetated roof, while at your school it may look like a parking lot made with permeable pavement. LID has been characterized as a sustainable stormwater practice by the Water Environment Research Foundation and others.

Although the increase in application of these practices is growing rapidly, data regarding both the effectiveness of these practices and their costs remain limited. In the vast majority of cases, the U.S. Environmental Protection Agency (EPA) has found that implementing well-chosen LID practices saves money for developers, property owners, and communities while protecting and restoring water quality.

As water becomes an ever-increasing issue nationwide, managing our stormwater properly is not only a green technology, it is a necessity. And through the use of Low Impact Development strategies, properly managing stormwater is something all of us can do.

Benefits of LID:

- improved aesthetics
- reduced maintenance cost of stormwater infrastructure
- economic growth in companies helping people adopt LID
- infrastructure expanded recreational opportunities
- · reduced runoff volumes and pollutant loadings to downstream waters
- reduced incidences of combined sewer overflows
- enhanced property values
- restoration of key
- ecosystem services
- improved habitat
- improved quality of life.

¹ See appendix 1 for a more detailed discussion of point vs. non-point sources.

MAINE'S ENVIROTHON -CURRENT ISSUE PROBLEM STATEMENT 2012:

- 1. Your team will discuss how LID addresses NPS pollution and research information about the present use of LID in your community.
- Generally, what is NPS pollution and how does LID reduce it?
- Where is LID currently used in your community? What is the goal?
- How does NPS pollution affect human health, the environment and the economy?
- How can individuals in their homes, schools, neighborhoods, farms and/or small businesses use
- LID to reduce NPS pollutants?
- 2. Choose an NPS pollutant, explain its sources and explain how an LID practice can be applied to reduce the quantity or effects of the pollutant in aquatic habitats.
- What is the NPS pollution issue and how does LID deal with it?
- What efforts (LID or non-LID) have already been implemented to try to combat the problem?
- What legislative or regulatory frameworks exist to encourage the use of LID?
- 3. Develop an oral presentation that shows the results of your research.

What different NPS pollution issues might different groups face (e.g. homeowners, schools, neighborhoods, small businesses, and government) face?

- Which LID technologies would be most appropriate for each issue and group?
 *This need not be an exhaustive list a few well articulated examples will suffice.
- What impact will ignoring the NPS pollution problem have on human health, the environment and the economy?
- 4. Create a poster to show your plan implementing LID to eliminate or mitigate the effects of your NPS pollution issue.
- Your poster should include an outline of the NPS pollution issue, its social, environmental, and economic consequences, and how LID addresses this problem or its consequences. Also reference examples of where LID is used locally to address this issue (if you can find any).
- Be sure to include the potential positive and possibly negative consequences for human health, the environment and/or the economy that may result from your plan being implemented.
- It is also important to consider how you will communicate the success of implementing your LID solution.

EXPECTATIONS FOR POSTER PRESENTATION:

Project Overview: Provide a title for your plan with a brief description of the NPS pollution problem and LID solution.

- What does the NPS pollution issue affect? (e.g. human health, the environment, the economy)
- Where will you implement this LID solution for the NPS pollution issue. (You may want to include a map illustrating the location and surrounding area.)
- How will your LID solution prevent, fix, or mitigate this problem.
- How will you communicate your solution to audiences outside of Maine who may be seeking to address similar problems?

Implementation Details: Clearly describe your plan (another conceptual diagram or site map might be helpful) and how exactly LID will solve the NPS pollution problem.

- Provide a timeline for implementation of your plan.
- Describe the criteria (goals) for determining if the LID solution is successful. How will you measure these criteria?
- Who are the partners you will have to engage to successfully implement your LID solution? How much will implementing this plan cost?

You will be judged on your overall understanding of how your chosen NPS pollution issue impacts the local community, environment and/or economy and how the use of LID will mitigate these negative effects.

You may find the following resources helpful in identifying the problem and formulating a solution. These resources are a first step to fully answering the questions you formulate – if you want to know more, I suggest you come up with a list of questions and set up a meeting with a business or government representative who can tell you more about LID and how they use it.

http://www.lowimpactdevelopment.org/

http://www.lid-stormwater.net/

http://www.mainenemo.org/

http://clear.uconn.edu/tools/lidmap/

http://maine.gov/dep/blwq/docwatershed/materials/LID guidance/manual.pdf

http://efc.muskie.usm.maine.edu/docs/lid fact sheet.pdf

http://www.epa.gov/region1/topics/water/lid.html

http://www.unh.edu/unhsc/

http://www.toolbase.org/PDF/DesignGuides/Municipal LID.pdf

http://www.maine.gov/dep/blwq/docwatershed/lp-nps1.htm

http://www.envirothon.org/pdf/2012/01 fact sheet 1.pdf

http://www.envirothon.org/pdf/2012/02 fact sheet 2.pdf

http://www.envirothon.org/pdf/2012/03 EPA reducing stormwater costs.pdf

http://www.envirothon.org/pdf/2012/04 EPA green infrastructure.pdf

http://www.envirothon.org/pdf/2012/05_EPA_roofcover.pdf

http://www.envirothon.org/pdf/2012/06 LID q and a.pdf

http://www.envirothon.org/pdf/2012/07_LID_literature_review.pdf

http://www.envirothon.org/pdf/2012/08_LID_big_box_retailers.pdf

http://www.envirothon.org/pdf/2012/09 NRDC stormwater strategies.pdf

http://www.envirothon.org/pdf/2012/10 SWMPC LID NEWS 1.pdf

http://www.envirothon.org/pdf/2012/11 SWMPC LID NEWS 2.pdf

http://www.envirothon.org/pdf/2012/12 SWMPC LID NEWS 3.pdf

http://www.envirothon.org/pdf/2012/13 SWMPC LID NEWS 4.pdf

http://www.envirothon.org/pdf/2012/14 SWMPC LID NEWS 5.pdf

Appendix I. Point vs. non-point sources of pollution.

Generally:

Statutory Point Sources

- Municipal and industrial wastewater effluents
- Runoff and leachate from solid waste disposal sites
- Runoff and infiltrated water from concentrated animal feeding operations (CAFO)
- Runoff from industrial sites not connected to storm sewers
- Storm sewer outfalls in urban centers with populations of more than 100 000
- Combined sewer overflows
- Leachate from solid waste disposal sites
- Runoff and drainage water from active mines, both surface and underground, and from oil fields
- Other sources, such as discharges from vessels, damaged storage tanks, and storage piles of chemicals
- Runoff from construction sites that are larger than 2 ha

Statutory Nonpoint Sources

- Return flow from irrigated agriculture
- Other agricultural and silvicultural runoff and infiltration from sources other than confined concentrated animal operations
- Unconfined pastures of animals and runoff from range land
- Urban runoff from sewered communities with a population of less than 100 000 not causing a significant water quality problem
- Urban runoff from unsewered areas
- Runoff from small and/or scattered (less than 2 ha) construction sites
- Septic tank surfacing in areas of failing septic tank systems and leaching of septic tanks effluents
- Wet and dry atmospheric deposition over a water surface (including acid rainfall)
- Flow from abandoned mines (surface and underground), including inactive roads, tailing, and spoil piles
- Activities on land than generate wastes and contaminants, such as:
- Deforestation and logging
- Wetland drainage and conversion
- Channeling of streams, building of levees, dams causeways, and flow-diversion facilities on navigable waters
- Construction and development of land
- Interurban transportation
- Military training, maneuvers, and exercises
- Mass outdoor recreation

In the State of Maine:

Nonpoint source.

"Nonpoint source" means any source, excluding any source defined as a direct discharge, that discharges pollutants into the surface or ground waters of the State, including, but not limited to, sources related to agriculture, construction and maintenance of bridges, railways and roads, forest management and commercial, industrial or residential development.

Direct discharge (think of this as a point source). "Direct discharge" means any discernible, confined and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation or vessel or other floating craft, from which pollutants are or may be discharged.